In Holland the tests are made by experts. In England they are applied by persons who, however well they may be qualified to examine candidates in navigation and seamanship, have certainly no *locus standi* in the matter of reporting upon the perfectness, or otherwise, of a man's visual organs.

The tests themselves that these navigation examiners have to apply are far from being perfect. They are established upon a wrong principle. Candidates are made to name colours, and according to the Parliamentary Report of 1887 "the only reasons for which they are reported as having failed are inability to distinguish red from green, and either from black by daylight, and red from green and either from ground glass by artificial light."

Candidates are first required to give correct colour names to a series of eight cards coloured black, red, green, pink, drab, blue, white, and yellow, respectively. A candidate is passed, however, if he names correctly the first three.

The second test consists in naming the colours of glasses some eleven in number, viz. ground glass, standard red, pink, three shades of green, yellow, neutral tint, two shades of blue, and white. The candidate need, however, only name the ground glass, the standard red, and the standard green.

Clearly, with such tests as these, the colour-blind may easily escape detection.

The Board of Trade return relative to colour tests for the year ending May 31, 1891, shows that out of 4688 candidates who presented themselves for masters' and mates' certificates, 31 were rejected on account of deficient colour sense. That these should be rejected after serving an apprenticeship to the sea, is manifestly unfair. The test should be applied at the commencement of their nautical career, and not when the initial stage is passed. Four of the 31 were reported as passing on subsequently undergoing examination, although medical expert opinion is emphatic in stating that colour-blindness is absolutely *incurable*. Perhaps it may be that the examiners were disposed, by their leniency in passing young men whose previous "failure in colours" proved them colour-blind, to atone in some slight form for the bad system which allows lads to spend the best years of their life in mastering the irksome details of a profession, before it informs them that they are visually unfitted for it. It is to be hoped that the investigation into the whole system of colour-testing at present being conducted by a committee appointed by the Royal Society, may lead to thorough and effective reforms.

T. H. BICKERTON.

ON VAN DER WAALS'S TREATMENT OF LAPLACE'S PRESSURE IN THE VIRIAL EQUATION: A LETTER TO PROF. TAIT.

MY DEAR PROF. TAIT,—I gather from your letter of September 28 (NATURE, October 8, p. 546) that you admit the correctness of Van der Waals's deduction from the virial equation (1) when the particles are infinitely small, in which case

$$\left(p + \frac{a}{v^2}\right) v = \tfrac{1}{3}\Sigma m\mathrm{V}^2 \quad . \quad . \quad . \quad . \quad . \quad (1)$$

a representing a cohesive force, whose range is great in comparison with molecular distances; and (2) when, in the absence of a cohesive force, the volume of the particles is small in comparison with the total volume *v*, in which case the virial of the repulsive forces at impact gives

$$p(v - b) = \tfrac{1}{3}\Sigma m\mathrm{V}^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

For hard spherical masses, the value of *b* is four times the total volume of the sphere. But you ask, "How can the factor $(v - b)/v$, which Van der Waals introduces on the left (in the first case) in consequence of the finite diameters of the particles, be justifiably applied to the term in K (or a/v^2) as well as to that in *p*?"

In my first letter I desired to avoid the complication entailed by the consideration of the finite size of the particles; but it appears to me that the argument there given (after Van der Waals) suffices to answer your question. For, if the cohesive force be of the character supposed, it exercises no influence upon any particle in the interior, and is *completely* accounted for by the addition to *p* of a/v^2. In so far, therefore, as (2) is correct when there is no cohesive force, the effect of such is properly represented by

$$\left(p + \frac{a}{v^2}\right)(v - b) = \tfrac{1}{2}\Sigma m\mathrm{V}^2 \quad . \quad . \quad . \quad . \quad (3)$$

in which *b* is to be multiplied by a/v^2, as well as by *p*.

Yours very truly,

October 13. RAYLEIGH.

NOTES.

AT the Royal College of Physicians, on Monday, when the Harveian Oration was delivered by Dr. W. H. Dickinson, the Baly Medal was given to Prof. Michael Foster for distinction in physiology; the Morgan Medal to Sir Alfred Garrod for distinction in clinical medicine.

DR. DICKINSON, in the Harveian Oration, presented an admirably clear and vigorous account of Harvey's great discovery, and of the scientific results to which it has led. The earliest and most important of these results was the completion of Harvey's work by the discovery of the capillary system by Malpighi, who was born in the year in which Harvey published his famous treatise. "Harvey," said Dr. Dickinson, "had never seen a capillary, nor did the state of the microscope in his time allow of it. He was fain to conclude that the blood passed from the arteries to the veins partly by anastomoses but mainly by percolation, as water, to quote his own illustration, percolates the earth and produces springs and rivulets. Had it been possible, we may imagine the delight with which he would have witnessed the completion by vessels of his circular route." Dr. Dickinson also referred, among other results of Harvey's discovery, to embolism, and to our knowledge of inflammation, or at least as much of it as concerns the capillaries. In conclusion, he said:—"Knowledge has been advancing since Harvey's time in many and independent lines; the achievements of Bell, Bright, and Addison had no direct connection with his, but it is not too much to assert that the medicine of to-day is scarcely less permeated with the results of Harvey's discovery than is the human body with the circulation he discovered. It does not make him small to say that what he found out must have come to light had he never lived. If Columbus had not discovered America some one else must have done so before now. The law of gravity might even have been revealed in the fulness of time to another if not to Newton. But the discoverer is before his time; in this lies one measure of his praise; another, and a more important one, is in the results of his discovery."

THE Electrical Exhibition, to be opened at the Crystal Palace on January 1 next, promises to be one of great interest and importance. The requests for space—which already exceed a total of 200—include electric lighting plants for country and town houses, for mines, for steamships, for railway trains, and even for private carriages. There are also included the newest forms of motors, generators, accumulators, and other machinery employed for producing and storing electricity. Several of the more important exhibits at the Frankfort Exhibition will be transferred to the Crystal Palace. The apparatus section will include a complete set of Sir William Thomson's standard electric instruments, new electro-medical and electro-thermic apparatus, the latest improvements in telephony and telegraphy, and also the most recent electrical appliances for war purposes, blasting, signalling, &c. Special buildings are now in course of erection for boilers and other heavy machinery.

THE Municipality of Genoa has voted the sum of 15,000 lire in aid of the International Botanical Congress which is to be held in that city in September 1892 to celebrate the fourth centenary of the discovery of America.

THE French Association for the Advancement of Science will meet at Besançon in 1893.

THE Russian Geographical Society has awarded its great Constantine Medal to Prof. Sludsky for his researches into the figure of the earth and his geodetical work generally. Another Constantine Medal has been given to Prof. Pontebnya for his researches into the ethnography and the languages of the Great Russians, the Little Russians, and other Slavonians. His two works on the Russian grammar far surpass all previous works of the kind, not only in the number of examples but in the novelty and importance of his conclusions as to the structure of the Russian and other Slavonian languages; while his works on Great and Little Russian folk-lore are full of new and profound observations. The Count Lütke's medal has been awarded to S. D. Rylke for an elaborate work on the determinations of longitudes in Russia by means of the telegraph; the probable error of the chief determinations does not exceed 0·016 of a second of time. Another work of the same geodesist deals with the possible errors of levellings, as dependent upon temperature; they appear considerably to exceed those admitted in the best treatises on this subject. We also learn from Mr. Rylke's researches that the level of the Baltic Sea, as deduced from long series of observations, regularly sinks in the direction from north to south. Other gold medals have been awarded to Rovinsky, for a work on the geography and history of Montenegro; to M. Filipoff, for researches into the changes of the level of the Caspian Sea; to M. Obrutcheff, for a geological and orographical sketch of the Transcaspian region; and to M. Priklonsky, for a work on the Yakutes. Some silver medals have been awarded for works, chiefly in ethnography, of minor importance.

DR. A. R. FORSYTH, F.R.S., and Dr. M. J. M. Hill have been nominated to fill up the vacancies caused by the retirement of Dr. Hirst, F. R.S., and Mr. Lachlan from the Council of the London Mathematical Society.

MR. JOSEPH THOMSON has returned to England from South Africa, where he has been at work on behalf of the British South Africa Company. Accompanied by Mr. Grant, a son of Colonel Grant, he crossed the plateau between Lake Nyassa and Lake Bangweolo, and we learn from the *Times* that he has been able to make important rectifications in the geography of the Bangweolo region. The lake, as shown in our maps, is incorrectly laid down, mainly because the one definite and precise observation taken by Livingstone has not been adhered to. The lake is really only a backwater of the Chambeze (the source of the Congo), which enters from the east, and issues from the west of the lake as the Luapula. The lake, in fact, lies in a very slight depression of the plateau to the north of the Chambeze-Luapula. Even in the rainy season Mr. Thomson believes the lake does not exceed 20 feet at its deepest. The southern shores are clothed with forests, and, as a matter of fact, Mr. Thomson encamped far within the bed of the lake as it is laid down in most maps. In the rainy season the water of the lake spreads out, and covers for some distance the ground on which the forest stands.

MR. W. L. SCLATER, the Deputy Superintendent of the Indian Museum, Calcutta, will proceed to Upper Assam in December next, upon a collecting expedition for the benefit of the Museum. From Makum he will ascend the Dibing river in boats to the mouth of the Dapha, one of its confluents from the north, and establish his camp at some convenient spot in the Dapha valley. At the head of the Dapha valley rises Dapha Búm, a mountain of some 15 000 feet in altitude, on the frontiers of Chinese territory, so that there is a good prospect of the occurrence of Chinese forms in the district. The Dapha valley has been described geographically by Mr. S. E. Peal, who visited it in 1882 (see J.A.S.B., lii., pt. 2, p. 7), but has not been much explored zoologically. Mr. Sclater will pay special attention to mammals and birds.

MR. FRANK H. BIGELOW, who has been acting as assistant in the U.S. Nautical Office, has been appointed to a newly-created professorship in the American Weather Bureau. His work will relate to terrestrial magnetism and solar physics, especially in their relation to meteorology.

NEWS has been received of M. Paul Maury, who started in March last year for a botanical expedition in Mexico, and of whom nothing had been heard since his departure. He appears to have made a successful exploration of the province of Huasteca.

DR. S. WINOGRADSKY, of Zürich, has been appointed director of the scientific bacteriological section of the new Bacteriological Institute at St. Petersburg.

A NOTICE which will be read with interest by owners of gems has been issued by Dr. A. Brezina, the Director of the Mineral Department of the Natural History Museum at Vienna. It relates to the doings of a young man who, on September 26, contrived to conceal himself in the Department just before the time for the closing of the Museum. He was caught, and found to be armed with a revolver, and to have in his possession files and other implements. He had also in his possession nearly 600 gems, some of them cut, but the majority in their natural state. He has a passport, in which he is described as Hugo Kahn, of Berlin; but he has also called himself Krony, Kronek, Kornak, Kronicsalsky. His age is twenty-four; he measures in height 170 cm.; he is slender, has a longish, handsome face, is of a brownish complexion, has dark hair, grey eyes, and a light-brown beard, which is of feeble growth. Upon the whole, he is an attractive-looking person. He has made several journeys in Germany, France, Switzerland, and Italy; and between the middle of July last and the beginning of September he travelled through Pyrmont, Ems, Strasburg, Basel, Milan, Genoa, Nice, Monaco, Genoa, Venice, to Vienna. Most of the gems (the names of which, with the exception of a rock crystal, he does not know) he professes to have bought from a barber in Marseilles. As it is important that the former owner or owners should be known, Dr. Brezina prints a list of the gems, with the request that anyone who has information about them will communicate with him.

ON Monday the centenary of the Royal Veterinary College in Great College Street, Camden Town, was celebrated by a luncheon given in a tent which had been erected in front of the new buildings. The Duke of Cambridge, President of the College, took the chair, and the Prince of Wales was among the guests. In proposing the toast, "Success and continued prosperity to the institution," the Prince of Wales contrasted the important position of the College at the present day with its humble beginnings a hundred years ago.

WE regret to record the death of the Rev. Percy W. Myles, of Bright's disease, at the comparatively early age of fortytwo, at Ealing, on October 7. He was a man of great ability both in literary and scientific pursuits. He was a good botanist, and proved himself a most able editor of *Nature Notes*, the journal of the Selborne Society. The work with which his name will be identified is the "Pronouncing Dictionary of Botanical Names," appended to Nicholson's "Dictionary of Gardening"; it is now recognized as a standard work by botanists. Unfortunately his professional duties did not enable him to leave a margin; so that it is proposed to raise a "Myles Memorial Fund" on behalf of his widow; and any contributions will be thankfully received and at once acknowledged by the Rev. Prof. G. Henslow, Drayton House, Ealing, London, W.

The Council of the Institution of Civil Engineers has issued a list of subjects on which it invites communications. The list is to be taken merely as suggestive, not in any sense as exhaustive. For approved papers, the Council has the power to award premiums, arising out of special funds bequeathed for the purpose. A detailed list is given of the awards made for original communications submitted during the past session.

More than ten earthquake shocks were felt in the island of Pantellaria, between Sicily and the Tunisian coast, between 5.30 p.m. and 4 a.m. on October 14–15. Some of the shocks were rather violent, and nearly all the inhabitants left their houses and passed the night in the streets or in the open country. According to intelligence received at the Central Meteorological Bureau, Rome, from Pantellaria on October 18, shocks of earthquake continued to be felt in the island. A remarkable phenomenon is announced in connection with these seismic disturbances. A new volcano has risen from the bed of the sea, not far from the coast of the island, and has been throwing up masses of stones and rubbish to a considerable height. A "slight eruption" from it was referred to in a telegram sent from Rome on October 20.

Last winter there were some reports that sunset phenomena had greatly increased in brilliancy, as if something similar to the optical disturbance following the Krakatão eruption had occurred. Herr Busch has remarked (*Met. Zeit.*) how difficult it is to recognize gradual variations in such phenomena, or to say where they pass beyond the normal. Even the brown-red Bishop's ring may be regarded as quite normal in winter. A much more sure method of finding an optical disturbance of the atmosphere is measurement of the polarization of light. Herr Busch has carried this on systematically for some years with a Savart polariscope, and a simple instrument for measuring angles, determining the height of the two neutral points (Babinet's and Arago's) at sunset. Now, the values for this height, in February and May last, considerably exceed those obtained in the three previous years, and come near those in 1886, when the last traces of the great atmospheric disturbance were still everywhere perceptible. It would seem, then, that some optical disturbance has been really present, the beginning, extent, and cause of which, however, are in obscurity. The desirability of systematic observations in different places is pointed out.

In our issue of October 8 (p. 549) we drew attention to three atlases issued by the Chief Signal Officer of the U.S. Army. We have now to record the publication, dated June 15 last, of an atlas containing seventy-two charts showing the normal temperature conditions in the United States and Canada by decades, three decades to each month, for 8h. a.m. and 8h. p.m., Washington time. Although the Signal Service has been in existence upwards of twenty years, it had not before been able to accumulate sufficient actual observations at any one hour, or set of hours, from which normal values could be derived. The values and isotherms contained in the present atlas are based upon nine years' observations, 1881–89. The charts have been carefully prepared, for the work of the Forecast Division, and will also be very useful in furnishing general information upon the average temperature of North America. The work has been prepared under the supervision of General Greely, although issued by the new Weather Bureau.

The Ealing *Middlesex County Times* (October 17) prints the following account of an incident which occurred at "The Grange," the residence of Mr. Yates Neill, Ealing, on Wednesday, October 14:—"It appears that during Tuesday night a large branch of one of the magnificent chestnut trees standing in the ground was broken off by the force of the wind, and fell on two stripling chestnut trees near the wall. On Wednesday morning, the gardener, a man named Parker, was engaged in sawing the detached bough, Mr. Delancey Neill and Mr. Vertie Neill watching the operation. Just before noon, the first-named gentleman saw what appeared to him to be a ball of fire fall, and striking the tree in an oblique direction, alight on the ground within two or three yards of where the three were standing, whence it rebounded and exploded with a sound like dynamite. Although neither of them was struck, the shock was so great that for a time all three were dazed, Mr. Vertie Neill, indeed, being thrown down, and rolling over two or three times. His brother was the first to recover from the shock, and promptly went to his help, and he was removed to the house, where the feeling of dizziness speedily wore off; and beyond somewhat severe headaches, which lasted for some hours, neither of the gentlemen nor the gardener appeared to have suffered any ill effects. The trunk of the tree struck by the meteor presents the appearance of having been burned in a zigzag direction for a distance of some 20 or 30 feet."

Most people who visit Greece devote their attention mainly to the remains of ancient art. Dr. Philippson, of Berlin, is of opinion that they might also with advantage spend some time in climbing the mountains of Greece. In the *Zeitschrift des Deutschen und Oesterreichischen Alpenvereins* he deals with the subject in a capital paper, which has been issued separately. He gives an attractive account of his own experiences in climbing Mount Chelmós, in the Peloponnese, describing admirably the impression produced upon him by the Styx. Dr. Philippson shows that in the Highlands of Greece there is still much good work to be done in topography, geology, and meteorology; and he sees no reason why some of it should not be accomplished by tourists.

Messrs. W. H. Allen and Co. have published a second edition of the late Mr. R. A. Proctor's "Other Suns than Ours."

The new number of the *Internationales Archiv für Ethnographie* opens with a most interesting paper (in German) by Dr. I. Zemmrich on "The Islands of the Dead, and related Geographical Myths." The author shows how widely diffused is the belief that there are far-off happy islands, where all sorts of enjoyments are in store for the dead; and he suggests that Atlantis, about which so much has been written, was originally one of these mythical realms. Dr. J. Jacobs concludes his critical examination (in Dutch) of Dr. Ploss's view of the significance of circumcision.

Mr. G. J. Symons, F.R.S., contributes to the current number of the Quarterly Journal of the Royal Meteorological Society a learned paper on the history of rain-gauges. It was read before the Society on March 18, in connection with the annual exhibition, and is one of the series in which hygrometers, anemometers, instruments for travellers, thermometers, sunshine recorders, barometers, marine instruments, apparatus for studying atmospheric electricity, solar radiation instruments, and the application of photography to meteorology, have been successively dealt with. Among the remaining contents of the number are papers on the following subjects: meteorological photography, by A. W. Clayden; on the variations of the rainfall at Cherra Poonjee, in the Khasi Hills, Assam (plate), by H. F. Blanford, F.R.S.; some remarkable features in the winter of 1890–91 (four illustrations), by F. J. Brodie; the rainfall of February 1891, by H. S. Wallis; "South-east Frosts," with special reference to the frost of 1890–91, by the Rev. F. W. Stow.

In the latest record of the proceedings of the Philosophical Society, Philadelphia, Dr. Daniel G. Brinton gives some vocabularies from the Musquito Coast. He obtained them from the Rev. W. Siebärger, a missionary of the United Brethren, now resident in that region. The most important of the vocabularies is a list of words from the language of the Ramas tribe, the only specimen of their tongue Dr. Brinton has ever secured. These people live on a small island in Blomfield lagoon. There are at present about 250 of them. All of them have been converted to Christianity, and, with the exception of a few very old persons, are able to speak and read English. Their native language is rapidly disappearing, and in a few years, probably, no one will use it fluently and correctly. They are large and strongly built, and are described as submissive and teachable. Their language has always been regarded as wholly different from that of the Musquito Indians, who occupy the adjacent mainland; and this is shown to be correct by the specimen sent to Dr. Brinton. It bears no relation, he says, to any other tongue along the Musquito Coast. It does not, however, stand alone, constituting an independent stock, but is clearly a branch, not very remote, of a family of languages once spoken near Chiriqui lagoon, and thence across—or nearly across—to the Pacific.

The Penang Administration Report for 1890 contains some interesting observations on the little-known aborigines of the Malay Peninsula. Observations made during the course of the year go to show that the Sakai (as distinguished from the Semang, or Pangan, as the Negrito tribes are called by the Malays of Perak and Pahang respectively) are far more numerous than was formerly supposed, and the President is of opinion that there may be more than 5000 men, women, and children in the district of Ulu Pahang alone. The country on both sides of the mountain range, which forms the watershed of the Jelai, Selom, Bidor, and Kampar rivers, is thickly inhabited by Sakai, who, although one or two large villages exist, live for the most part in groups of from two to three families. These Sakai are divided into two distinct tribes, called by themselves Sen-oi and Tem-be respectively, the former being the more civilized and more accessible tribe, while the latter are but little known to the Malays. Both the Tem-be and Sen-oi dialects, however, resemble one another so closely that it would seem to be evident that they originally sprang from the same source. Words to express any numerals higher than three are not found in the dialect of either tribe.

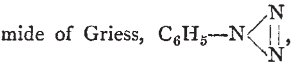
The mareograph in the harbour of Pola, according to Lieut. Gratzl (*Met. Zeitsch.*), often shows, in addition to the ordinary tidal curve, certain more or less regular oscillations, generally with a period of about 15 minutes (some with one of 7 minutes). These appear to be of the nature of *seiches*, and to be caused by squalls, which drive water from the open sea into the partly inclosed basin of the harbour, where it rises as a wave, retires, rises again to a less height (as only part of the surplus water escapes), and so on. Thus, in the evening of July 6, 1890, after a stiff west-north-west squall, there were eight pronounced oscillations, the strongest showing about 1·4 inch difference of level in 16 minutes. In another case, the harbour level rose higher than it had done for 15 years. The latter squall (a strong south-west one) affected also the Trieste mareograph, which showed nine wide oscillations with a mean period of 1 hour 46 minutes. Lieut. Gratzl suggests observations as to whether sudden impulses of "bora" against the Italian coast might not heap up the water there, so that a return wave might affect the Austrian mareographs; also whether certain sudden currents which injure fishermen's nets in the Dalmatian canals may not be connected with those waves.

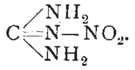
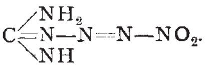
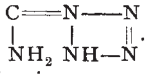
A cat born with only two legs (the fore-legs being absent from the shoulder-blades) has been recently described by Prof. Leon of Jassy (*Naturw. Rundsch*). It is healthy, and goes about easily, the body in normal position. When startled, or watching anything, it raises itself to the attitude of a kangaroo, using the tail as a support. This animal has twice borne kittens; in both cases two, one of which had four feet, the other only two.

We learn from Dr. Woeikof's notes of a journey in the Caucasus published in the Russian *Izvestia*, that the Russian Ministry of Ways and Communications has issued a very interesting work on the snow-slips of the Kazbek glaciers, accompanied by an atlas of maps and plans. Careful measurements of the variations in the position of the lowest end of the Devdorak glacier since 1878 have been made, and the results are given in the atlas. A house has been recently built close to the glacier, and it is connected by a road (available for horses) with the villages beneath. An experienced guide, who is bound to accompany the men of science and tourists who may intend to visit the glacier, stays in the house.

A kind of artificial honey which has lately been produced seems likely to become a formidable rival of natural honey. It is called "sugar honey," and consists of water, sugar, a small proportion of mineral salts, and a free acid; and the taste and smell resemble those of the genuine article. Herr T. Weigle brought the subject before a recent meeting of the Bavarian Association of the Representatives of Applied Chemistry, and there is a paragraph about it in the current number of the *Board of Trade Journal*.

Rats at Aden appear to have a vigorous appetite, and to adopt remarkable ways of gratifying it. Captain R. Light, writing on the subject from Aden to the Journal of the Bombay Natural History Society, says the rats in his house—which is overrun with them—demolish skins, braces, whips, &c.; and one night he awoke, feeling a rat gnawing at his toes. This happened in spite of a dog (a good ratter) being in the room. Captain Light was lately watching his pony being shod, and noticed the hoof apparently cut away all round the coronet, wherever it was soft. He accused the "nalband" of doing this in addition to the usual rasping of the hoof to suit the shoe. The "syce" said that the rats had done it, and that they came at night and ate away not only the pony's hoofs but those of the goat and kid, and that these animals were greatly tormented by the rats. Captain Light examined the hoofs, and found beyond doubt that such was the case, the marks of the teeth being plain; moreover, he found that the horns of the kid, which had been about half an inch high, were eaten flush with the head. Next morning, too, a large rat was discovered in the bedding under the horse. It had evidently been killed by a kick from him.

Two new methods of preparing azoimide, N_3H, the hydride of nitrogen isolated last year by Prof. Curtius, of Kiel, have been discovered. As announced at the time in Nature (vol. xliii. p. 21), Prof. Curtius prepared this remarkable compound by reacting with his previously isolated hydrazine hydrate, $N_2H_4.H_2O$, upon hippuric acid, converting the hydrazine derivative thus obtained into its nitroso-derivative, and decomposing an alkaline solution of the latter with sulphuric acid. An aqueous solution of azoimide was obtained upon distilling the product of the latter operation. In order to obtain the free compound itself, the silver salt was prepared by allowing the distillate to flow into a solution of silver nitrate, and the precipitated silver salt, after drying, was decomposed with sulphuric acid. In a subsequent communication (comp. NATURE, vol. xliii. p. 378), Prof. Curtius, in conjunction with Dr. Radenhausen, showed that the pure compound was a very volatile liquid, boiling at 37°, and of fearfully explosive properties. In the current number of the *Berichte*, Drs. Noelting and Grandmougin, of Mülhausen, publish a preliminary note, in which they describe a new, and from the point of view of its constitution most important, method of preparing the liquid. The phenyl ester of azoimide is the diazobenzene imide of Griess,  $C_6H_5—N\!\left\langle\begin{array}{c}N\\ \|\\ N\end{array}\right.$, just as chlorbenzene is the phenyl ester of hydrochloric acid. In view of the great stability of the esters of aromatic radicles, it was hardly to be expected that diazobenzene imide would yield azoimide upon saponification. But Drs. Noelting and Grandmougin considered that it might be possible to obtain the latter by decomposing a nitro-derivative of diazobenzene imide by means of alkalies, inasmuch as the introduction of nitro-groups generally effects a considerable increase in the mobility of the acid radicle, rendering its removal by processes of saponification much less difficult. They therefore prepared the dinitro-derivative of diazobenzene imide from dinitro-aniline by means of the usual diazo-reaction—conversion into the perbromide, and treating with ammonia. When treated with alcoholic potash, this dinitro-diazobenzene imide readily decomposes into the potassium salt of dinitro-phenol and azoimide. Upon acidifying the product of the reaction and subjecting it to distillation, an aqueous solution of azoimide passes over, which may be converted into the anhydrous liquid by the method described by Prof. Curtius. The properties of the anhydrous azoimide obtained by this new method agree completely with those detailed by Prof. Curtius.

THE second new method of preparing azoimide was communicated by Dr. Thiele, of Halle, at the Versammlung deutscher Naturforscher und Aerzte, held in that city in September last. In the course of an investigation of the compounds of guanidine, nitro guanidine was obtained,  $C\begin{array}{l}\diagup NH_2\\ =N—NO_2\\ \diagdown NH_2\end{array}$. Upon treating this compound with acetic acid and zinc dust, it is reduced to amido-guanidine, a substance which forms well-crystallized salts. By boiling the latter with soda, decomposition ensues, with formation of free hydrazine, N_2H_4, which may be very conveniently prepared by this method. Upon subjecting the nitrate to the diazo-reaction, the diazo-nitrate of guanidine is obtained,  $C\begin{array}{l}\diagup NH_2\\ =N—N=N—NO_2\\ \diagdown NH\end{array}$. This compound readily breaks up on warming into two compounds, one of which is azoimide, and the other a complex acid of the composition CN_5H_3, and the curious constitution  $\begin{array}{lll}C= & N— & N\\ | & | & \|\\ NH_2 & NH— & N\end{array}$. The azoimide may be obtained by distillation in a manner similar to that described above.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus* ♂) from India, presented by Mr. W. Harrow; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mrs. Cotton; a Common Marmoset (*Hapale jacchus*) from South-East Brazil, presented by Mrs. Trelawny; a Gannet (*Sula bassana*), British, presented by Mr. J. Hitchman; a Smooth Snake (*Coronella lævis*) from Hampshire, presented by Mr. F. C. Adams; ten Smooth Snakes (*Coronella lævis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

DISTRIBUTION OF LUNAR HEAT.—Mr. Frank H. Very's essay on the distribution of the moon's heat and its variation with the phase, which gained the prize of the Utrecht Society of Arts and Sciences in 1890, has recently been published. A bolometer in connection with a very sensitive galvanometer was used in the research, and the plan has been to project an image of the moon about 3 centimetres in diameter by a concave mirror; and to measure, not the heat from the whole of this, but only that in a limited part of it, from $\frac{1}{25}$ to $\frac{1}{30}$ of the area of the disk, the observations being repeated at different points and at different phases. Measures made six hours after full moon show that the east limb was hotter than the west limb in the proportion of 92·2 to 88·9. In one observation, made a day after full moon, the excess of heat at the east limb was much larger. There is a regular decrement of heat in passing from higher to lower latitudes, and observations on this point appear to indicate that heat is accumulated after many days of continuous sunshine. The heat in the circumferential zone of the full moon differs from that of the centre by about 20 per cent. In this respect, therefore, the thermal image is like the visual one. There seems to be some evidence that bright regions radiate a little more than dark during the middle of the lunar day; but this is not quite proved, and with a low altitude of the sun the effect is reversed. A comparison of the curve drawn by Zollner for the moon's light with that deduced from Mr. Very's observations brings out the point that visible rays form a much larger proportion of the total radiation at the full than at the partial phases, the maximum for light being much more pronounced than that for the heat. The diminution of the heat from the full to the third quarter is shown to be slower than its increase from the first quarter to the full. This result agrees with that obtained at Lord Rosse's Observatory, and is direct evidence of the storage of heat by lunar rocks.

GEOLOGICAL SOCIETY OF AMERICA.

THE Geological Society of America met at Washington on August 24 and 25. Owing to the death of the President, Prof. Alexander Winchell, Vice-President Gilbert took the chair.

The meeting was opened with an address on the late President by his brother, Prof. N. H. Winchell. Alexander Winchell was born on December 31, 1824, in Dutchess County, N.Y., and died at Ann Arbor on February 19 last. His work was many-sided. He had studied to be a civil engineer; had a strong leaning towards theology. He also read medicine and was a fine mathematician. He loved music, wrote poetry, and modelled in clay and plaster. As a financial resource he became a teacher, and was very successful. He became famous by his arguments on "The Bible History of the Creation," and published in the *Christian Advocate* "Adamites and Pre-Adamites," an exposition of Scriptural and scientific harmony. For four years he lectured on geology at Vanderbilt University. During his long connection with the University of Michigan he wrote many scientific articles of a popular nature, and did a great deal to popularize geological science. The speaker spoke eloquently of his dead brother's long and splendid connection with the Ann Arbor University. His death was most touchingly described. Oddly enough the last words he uttered in public were these: "When I speak to you again it will be of the inhabitants of another world." He had just finished his weekly lecture, and referred in his closing sentence to the subsequent lecture that was never delivered. He discovered many new geological species, and many other geologists testified their admiration for him by naming after him species they discovered. His great work for the Geological Society was touched on, and the speaker expressed his conviction that the next generation would keenly feel the beneficent influence of his brother's work. At the conclusion of the memorial Prof. Edward Orton, Dr. C. A. White, and Mr. C. R. Van Hise were appointed a committee to draft resolutions expressive of the Society's regret at the death of its President.

Prof. Dr. Gustav Steinmann, of the University of Freiburg, Germany, read the first paper, which consisted of the description of a geological map of South America. A large copy of the map was hung up beside the platform, and small replicas were distributed among the audience. Dr. Steinmann, who is a young, bearded, spectacled, typical German student, was sent to